ISSN (print) 0093-4666 © 2011. Mycotaxon, Ltd. ISSN (online) 2154-8889

MYCOTAXON

Volume 116, pp. 329–333 *April–June 2011*

DOI: 10.5248/116.329

Zwackhiomyces turcicus sp. nov. (*Ascomycota, Xanthopyreniaceae*) from Turkey

Mustafa Kocakaya[1], Mehmet Gökhan Halici[2*] & Ahmet Aksoy[3]

[1]*Bozok Universitesi, Fen Edebiyat Fakültesi, Biyoloji Bölümü, 66200 Yozgat, Turkey*
[2, 3]*Erciyes Universitesi, Fen Fakültesi, Biyoloji Bölümü, 38039 Kayseri, Turkey*
Correspondence to*: [1]*mustafa.kocakaya@bozok.edu.tr,* [*2]*mghalici@erciyes.edu.tr,* & [3]*aksoy@erciyes.edu.tr*

Abstract — *Zwackhiomyces turcicus* is described as new from the thallus of *Physcia magnussonii* from southern Turkey. The new species produces one of the largest ascomata in the genus and is easily differentiated from *Z. physciicola* (described from *Physcia caesia*) by its larger verruculose ascospores and thinner interascal filaments.

Key words — biodiversity, lichenicolous fungi, lichens

Introduction"

Grube & Hafellner (1990) established the genus *Zwackhiomyces* for *Arthopyrenia coepulona* and eight related lichenicolous taxa. Since then, several new species have been described or transferred to this genus, and Calatayud et al. (2007) provided a key to the known 22 *Zwackhiomyces* species. Thereafter, several authors have added new species (Hawksworth & Iturriaga 2006, Brackel 2008, Diederich & Zhurbenko 2009, Diederich & Schultz 2009, Roux 2009), bringing the total described to 28.

Six *Zwackhiomyces* species (Halıcı 2008, Halıcı & Candan 2009, Halıcı et al. 2009) are included among the 160 species of lichenicolous fungi reported from Turkey (Halıcı et al. 2010). Here we describe a new one from the region, *Zwackhiomyces turcicus* on *Physcia magnussonii*.

Material & methods

Type material is deposited in the herbarium of Erciyes University, Science & Art Faculty, Biology Department, Kayseri. Specimens were examined with a Leica DM-1000 research microscope. Photomicrographs were prepared using a Leica DFC 420. The perithecia were examined by handmade sections prepared by razor blade and examined in I (Lugol's iodine with [KI] and without [I] pre-treatment in 10% KOH), 10% KOH, and water. Ascus and ascospore measurements were made in water. Ascospore

measurements are given as: the arithmetic mean, flanked by the mean ± standard deviation and parenthetical minimum and maximum values. The length/breadth ratio of ascospores is indicated as l/b and given in the same way. The abbreviation n indicates the number of measurements.

Taxonomy

Zwackhiomyces turcicus Kocakaya, Halıcı & Aksoy, **sp. nov.** Fig. 1

MycoBank MB 519612

Fungus lichenicola in thallo Physciae magnussonii. *Perithecia nigra, superficialia, 200–450 µm diam.. Asci (65–)70–92(–95) × (18–)19–21(–22) µm. Ascosporae 1-septatae, hyalinae, verruculosae, (17–)18–22(–23) × (7–)8–9.5(–10) µm, l/b = (2–)2.15–2.47 (–2.57). Filamenta interascalibus 1–1.5 µm lata.*

Type collection: Turkey, Konya, Taşkent, Gevne Vadisi, *Pinus nigra* forest, 36°45' N, 32°25' E, alt. 1700 m, on thallus of *Physcia magnussonii* Frey on siliceous rocks, 6 August 2010, M. Kocakaya, M.G. Halıcı 0.6317 & A. Aksoy (Erciyes University, Lichen herbarium – **holotype**).

Etymology: The epithet "*turcicus*" refers to Turkey, where the type specimen was collected.

Lichenicolous on the lobes of *Physcia magnussonii*. Ascomata perithecioid, black, subglobose to globose, c. 200–450 µm diam., generally scattered on the margins of the lobes of the host thallus, arising singly, superficial. Ascomatal wall pseudoparenchymatous, of textura angularis, dark reddish brown, uniformly coloured, not distinctly separated into two layers, in section 30–60 µm wide, with 6–10 layers of the cells, with the inner layers slightly paler; cells ± rounded to somewhat irregular in surface view, mostly 4–7 µm diam. Hymenial gel I–, K/I–. Interascal filaments abundant, branched and anastomosing, c. 1–1.5 µm wide. Asci (4–)6–(–8)-spored, (65–)70–*81*–92(–95) × (18–)19–*20.5*–21(–22) µm (n = 20), the wall is thickened at the apex, with a distinct ocular chamber, elongate-clavate, stipitate, ascospores distichously arranged in the upper part, uniseriately arranged in the lower part, endoascus I+ orange-red and K/I+ orange-red, dehiscence fissitunicate. Ascospores 1-septate, markedly constricted at the septum, lower cell narrower than the upper cell, hyaline, with a verruculose surface, usually one big oil droplet present in each cell, (17–)18–*20*–22(–23) × (7–)8–*8.5*–9.5(–10) µm, l/b ratio: (2–)2.15–*2.31*–2.47(–2.57) (n = 50). Conidiomata not seen.

Ecology and distribution: The new species is known only from the type locality in southern Turkey, growing on *Physcia magnussonii* on siliceous rocks. It is commensalistic or weakly parasitic, as slight bleaching occurs on the infected part of the host thallus. The type specimen was collected in a *Pinus nigra* forest with a typical Mediterranean climate. As the host species is abundant in the northern hemisphere, the species should be searched for elsewhere, especially on epilithic *Physcia* species.

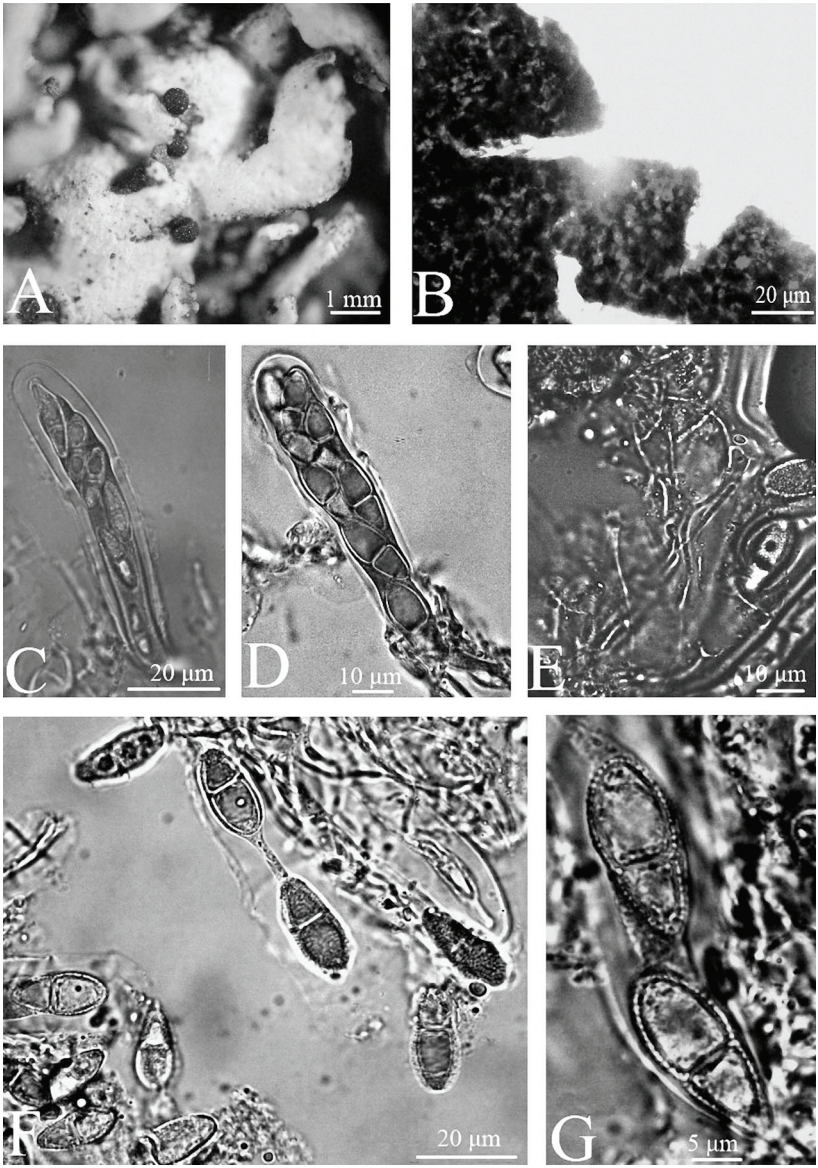

Fig. 1. *Zwackhiomyces turcicus* (holotype). A, Perithecia on the host thallus; B, Ascomata wall in K; C, 6-spored ascus in I; D, 8-spored ascus in I; E, Interascal filaments in K; F, Ascospores showing verruculose surface in I; G, Ascospores showing verruculose surface in I with higher magnification.

Observations: *Zwackhiomyces turcicus* and *Z. cladoniae* (C.W. Dodge) Diederich have the largest ascomata (c. 200–450 µm diam.) in the genus (Grube & Hafellner 1990, Hawksworth & Iturriaga 2006, Calatayud et al. 2007).

Another *Zwackhiomyces* species that also occurs on *Physcia* (*P. caesia*) is *Z. physciicola* Alstrup, described from Denmark with only a few mature ascospores (Alstrup 1993). *Zwackhiomyces physciicola* clearly differs in having much smaller (100–150 µm) ascomata, nonverruculose ascospores that are clearly narrower (5.5–6.5 µm) and constricted at the septa, and thicker (2 µm diam.) interascal filaments (Alstrup 1993). According to Diederich (pers. comm.), a careful examination of ascospores in Luxembourg material of *Z. physciicola* revealed the presence of three pairs of setulae fixed on the larger ascospore cell at c. 2 µm from the septum (Sérusiaux et al. 1999). The same kind of ascospore setula is known in most *Lichenopeltella* species (Aptroot et al. 1997) but has never been reported for *Zwackhiomyces*.

Zwackhiomyces berengerianus (Arnold) Grube & Triebel described on *Mycobilimbia berengeriana* has similarly sized ascospores, but they are slightly constricted at the septa and the perispore becomes brownish at maturity. Furthermore, *Z. berengerianus* has much smaller (125–180(–200) µm) ascomata than *Z. turcicus* (Grube & Hafellner 1990). *Zwackhiomyces kiszkianus* D.Hawksw. & Miadl. described on *Peltigera canina* also has verruculose ascospores, but the spores are longer and wider (19.5–25.5× 8.5–13 µm) than *Z. turcicus* and the ascomata are immersed (Hawksworth & Miadlikowska 1997). Another related species, *Z. coepulonus* (Norman) Grube & R.Sant. (known on *Xanthoria elegans* and *Caloplaca* spp.), has smaller ascomata which are immersed to superficial (150–250 µm) and slightly smaller ascospores ((15–)16–20(–21) × 5.5–8.5(–9)) (Grube & Hafellner 1990). As stated above, *Z. cladoniae,* which is known on *Cladonia* spp., is another species in the genus with very large ascomata, but it clearly differs from *Z. turcicus* in having much narrower and shorter (12–19 × 3–5 µm) ascospores (Hawksworth & Iturriaga 2006).

Acknowledgements

Paul Diederich and Ave Suija are thanked for reviewing this paper. Harrie Sipman is thanked for checking the Latin diagnosis. This study was financially supported by Erciyes University Scientific Research Project (FBD-10-3241 coded project).

Literature cited

Alstrup V. 1993. News on lichens and lichenicolous fungi from Nordic countries. Graphis Scripta 5: 96–104.

Aptroot A, Diederich P, Sérusiaux E, Sipman HJM. 1997. Lichens and lichenicolous fungi from New Guinea. Bibliotheca Lichenologica 64: 1–220.

Brackel W. 2008. *Zwackhiomyces echinulatus* sp. nov. and other lichenicolous fungi from Sicily, Italy. Herzogia 21: 181–198.

Calatayud V, Triebel D, Pérez-Ortega S. 2007. *Zwackhiomyces cervinae*, a new lichenicolous fungus (*Xanthopyreniaceae*) on *Acarospora*, with a key to the known species of the genus. Lichenologist 39: 129–134. doi:10.1017/S002428290700583X

Diederich P, Schultz M. 2009. *Zwackhiomyces namibiensis*, a new lichenicolous ascomycete (*Xanthopyreniaceae*) on *Psorotichia* from Namibia. Herzogia 22: 173–176.

Diederich P, Zhurbenko M. 2009. *Sphaerellothecium phaeorrhizae* and *Zwackhiomyces sipmanii* sp. nov. on *Phaeorrhiza sareptana* from north-eastern Asia, with a key to the species of *Sphaerellothecium*. Bibliotheca Lichenologica 99: 113–122.

Grube M, Hafellner J. 1990. Studien an flechtenbewohnenden Pilzen der Sammelgattung *Didymella* (*Ascomycetes, Dothideales*). Nova Hedwigia 51: 283–360.

Halıcı MG. 2008. A key to the lichenicolous *Ascomycota* (including mitosporic fungi) of Turkey. Mycotaxon 104: 253–286.

Halıcı MG, Candan M. 2009. New lichenicolous fungi from Turkey. Nova Hedwigia 88: 483–490. doi:10.1127/0029-5035/2009/0088-0483

Halıcı MG, Candan M, Özdemir Türk A. 2009. Notes on some lichenicolous fungi from Turkey II. Turkish Journal of Botany 33: 389–392.

Halıcı MG, Akata I, Kocakaya M. 2010. New records of lichenized and lichenicolous fungi from Turkey. Mycotaxon 114: 311–314.

Hawksworth DL, Iturriaga T. 2006. Lichenicolous fungi described from Antarctica and the sub-Antarctic islands by Caroll W. Dodge (1895–1988). Antarctic Science 18: 291–301. doi:10.1017/S0954102006000344

Hawksworth DL, Miadlikowska J. 1997. New species of lichenicolous fungi occurring on *Peltigera* in Ecuador and Europe. Mycological Research 101: 1127–1134. doi:10.1017/S0953756297003778

Roux C. 2009. *Naetrocymbe saxicola*, Likeno kun *Trentepohlia*. Bulletin de la Société Linnéenne de Provence 60: 127–142.

Sérusiaux E, Diederich P, Ertz D, van Den Boom P. 1999. New or interesting lichens and lichenicolous fungi from Belgium, Luxembourg and northern France. IX. Lejeunia 173: 1–48.